

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An Integrated integrated optics filtering component comprising:

~~in a substrate (10); and~~

~~at least one a~~ filtering unit (17) arranged in said substrate, said filtering unit comprising:

an optical guide core (11),

an optical cladding (13) independent of the core, and

at least two elementary zones of interaction elementary arranged in series (~~Z1, Z2, Z3, Z4~~), ~~in which each of said at least two elementary zone zones of interaction has including at least one a structural parameter that is different from that or those a structural parameter of an adjacent elementary zone of interaction to it, each of said at least two elementary zone zones of interaction elementary being defined by a zone of the substrate comprising including an elementary grating (R1, R2, R3, R4) for coupling configured to couple modes between the guide core and the optical cladding,~~

~~wherein at least one portion of the optical cladding called the elementary eladding (G1,G2,G3) surrounding surrounds a corresponding at least one portion of the optical guide core, called the elementary core, and~~

~~wherein a the refractive index of each of said at least one portion elementary of the optical cladding being is different from the a refractive index of the substrate and lower than the a refractive index of the corresponding at least one portion of the optical guide core at least in the a part of the elementary optical cladding next to that surrounds the elementary optical guide core, the different elementary gratings of a filtering unit forming a grating.~~

2. (Currently Amended) The Component component of claim 1, characterised in that wherein each elementary of said at least one portion of the optical cladding has a refractive index higher than that of the substrate.

3. (Currently Amended) The Component component of ~~any of claims 1 and 2 claim 1, characterised in that~~ wherein the elementary grating of one said at least two

elementary zones ~~a zone~~ of interaction is formed in the guide core and/or in the cladding and/or in the substrate.

4. (Currently Amended) ~~The Component~~ component of ~~any of claims 1 to 3~~ claim 1, ~~characterised in that wherein~~ each elementary zone of interaction ~~has at least one structural parameter different from that or those to which it is adjacent, in which each zone of interaction is differentiated from another zone of interaction by at least one characteristic selected from a group consisting of a coupling efficiency of the elementary grating corresponding to this zone, a central wave-length coupling wavelength for coupling of this the elementary grating and/or a coupling phase of the elementary grating.~~

5. (Currently Amended) ~~The Component~~ component of ~~any of claims 1 to 4~~ claim 1, ~~characterised in that for wherein in~~ each zone of interaction, the structural ~~parameters~~ parameter ~~are is~~ selected from a group consisting of at least the following:

- ~~the~~ a length L of the elementary grating,
- ~~the~~ a period Λ of the elementary grating,
- ~~the~~ a profile of the elementary grating,
- ~~the~~ a position of the elementary grating in the zone of interaction,
- ~~Δn the~~ an amplitude Δn of the an effective index modulation induced by the elementary grating,
- ~~ϕ the~~ a phase ϕ of the elementary grating,
- ~~the~~ dimensions of the ~~elementary~~ at least one portion of the optical cladding ,
- ~~the~~ dimensions of the ~~elementary~~ at least one portion of the optical guide core,
- ~~the~~ a value of the refractive index of the ~~elementary~~ at least one portion of the optical cladding ,
- ~~the~~ a value of the index of the ~~elementary~~ at least one portion of the optical guide core,
- ~~the~~ a position of the ~~elementary~~ at least one portion of the optical cladding in the substrate, and
- ~~the~~ a position of the at least one portion of the optical guide core ~~elementary~~ in the cladding.

6. (Currently Amended) The Component component of any of claims 1 to 5 claim 1, characterised in that wherein the a grating including the elementary grating of each zone of interaction has a profile that is constant in period and/or amplitude.

7. (Currently Amended) The Component component of claim 6, characterised in that wherein each of said at least one portion elementary of the optical cladding of a filtering unit has a section in a plane perpendicular to the direction of propagation of a light wave and/or a is-centred centering with respect to the corresponding at least one portion of the optical guide elementary core of the zone of interaction; different from those of a remaining of said at least one portion the other elementary claddings of the said filtering unit.

8. (Currently Amended) The Component component of claim 6 or 7, characterised in that wherein each elementary corresponding at least one portion of the optical guide core of a filtering unit has a section in a plane that is perpendicular to the a direction of propagation of a light wave and/or a eentred centering with respect to the elementary at least one portion of the optical cladding of the a corresponding zone of interaction; different to those of the other elementary cores of the said unit.

9. (Currently Amended) The Component component of any of claims 6 to 9 claim 6, characterised in that wherein the a function defined by the elementary gratings of said at least two elementary zones of a the filtering unit comprises phase changes.

10. (Currently Amended) The Component component of claim 9, characterised in that wherein the phase changes are formed produced between each elementary grating by an offset corresponding to a change in value of the a function phase created by the profile of the elementary grating.

11. (Currently Amended) The Component component of any of the previous claims claim 1, characterised in that wherein the filtering unit of the invention comprises a dissipating element configured to dissipate all or part of the cladding modes and arranged between two consecutive elementary claddings or between two consecutive groups of elementary claddings, a dissipating element for all or part of the cladding modes.

12. (Currently Amended) ~~The Component component~~ of claim 11, characterised ~~in that this~~ the dissipating element is created by a reduction in section between two elementary claddings.

13. (Currently Amended) ~~The Component component~~ of claim 11, characterised ~~in that this~~ wherein the dissipating element is ~~created by~~ includes an intermediate cladding, positioned between two elementary claddings, ~~the a~~ section of the intermediate cladding being smaller than at least one of the sections of the two elementary claddings.

14. (Currently Amended) ~~The Component component~~ of claim 11, characterised ~~in that this~~ wherein the dissipating element is created by in a zone of the substrate positioned between two elementary claddings.

15. (Currently Amended) ~~The Component component~~ of ~~any of the previous~~ claims claim 1, characterised ~~in that~~ wherein a sampling element is optically connected to the cladding of the filtering unit.

16. (Currently Amended) ~~The Component component~~ of ~~any of the previous~~ claims claim 1, characterised ~~in that it comprises~~ comprising several at least two filtering units.

17. (Currently Amended) ~~The Component component~~ of ~~any of the previous~~ claims claim 1, characterised ~~in that~~ wherein the filtering unit ~~creates~~ is a gain flattening filter.

18. (Currently Amended) ~~A Fabrication~~ method of manufacturing an integrated optics component comprising:

providing a substrate; and

modifying a refractive index of said substrate to create a filtering unit that comprises an optical guide core, an optical cladding independent of the core, and at least two elementary zones of interaction arranged in series, each of said at least two elementary zones of interaction including a structural parameter that is different from a structural parameter of an adjacent elementary zone of interaction, each of said at least two elementary zones of

interaction including an elementary grating configured to couple modes between the guide core and the optical cladding,

~~in a substrate at least one filtering unit (17) of any of the previous claims, characterised in that the core (11) and the cladding (13) of each filtering unit are respectively created by a modification of the refractive index of the substrate so that~~ wherein said refractive index is modified such that at least in the part of the optical cladding next to the optical guide core and at least in the zone of interaction, ~~the~~ a refractive index of the optical cladding is different from the refractive index of the substrate and lower than ~~the~~ a refractive index of the core, and

~~wherein in that the~~ a grating including elementary gratings of the filtering unit is created by a modification of the effective index of the substrate.

19. (Currently Amended) ~~The Fabrication~~ method of claim 18, ~~characterised in that the modification of the refractive index of the substrate is obtained by radiation and/or by the introduction~~ wherein said modifying includes irradiating said substrate and/or exposing said substrate to of ionic species

20. (Currently Amended) ~~The Fabrication~~ method of claim 19, ~~characterised in that it comprises the following steps~~ wherein said modifying comprises:

- ~~a) introduction of~~ exposing the substrate to a first ionic species in the substrate so as to permit the optical cladding to be obtained after step c),
- ~~b) introduction of~~ exposing the substrate to a second ionic species in the substrate so as to permit the guide core to be obtained after step c),
- ~~c) burying of the ions introduced in steps a) and b)~~ said first and second ionic species so as to obtain the cladding and the guide core,
- ~~d) formation of~~ forming the grating.

21. (Currently Amended) ~~The Fabrication~~ method of claim 20, ~~characterised in that~~ wherein the first and/or the second ionic species are introduced by an ionic exchange or by ionic implantation.

22. (Currently Amended) ~~The Fabrication~~ method of claim 20 ~~or 21~~, characterised in that wherein the substrate is ~~made of~~ includes glass and contains Na⁺ ions, the first and the second ionic species ~~are~~ including Ag⁺ and/or K⁺ ions.

23. (Currently Amended) ~~The Fabrication~~ method of ~~any of claims claim~~ 20 to 22, characterised in that ~~step a)~~ further comprising:

~~comprises the creation of~~ defining a first mask (61) on said substrate prior to exposing the substrate to the first ionic species, the first mask comprising a pattern capable of creating configured to define the cladding, in which the introduction of the first ionic species is carried out being introduced through this said first mask and step b) comprises the elimination

removing of the first mask, and the creation of

defining a second mask (65) on said substrate after removing said first mask and prior to exposing said substrate to said second ionic species, said second mask comprising a pattern capable of creating configured to define the core, in which the introduction of the second ionic species is carried out being introduced through this said second mask.

24. (Currently Amended) ~~The Fabrication~~ method of ~~any of claims claim~~ 20 to 22, characterised in that ~~step a)~~ further comprising ~~comprises the creation of~~ defining a mask comprising a pattern ~~capable of creating~~ configured to define the cladding and the core, ~~in which the introduction of the first and second ionic species is carried out through this being introduced through said mask.~~

25. (Currently Amended) ~~The Fabrication~~ method of ~~any of claims claim~~ 18 to 24, characterised in that wherein the grating is ~~obtained~~ formed during exposure of the substrate to by the introduction of ionic species through a mask permitting defining the core and/or the cladding to be created, or formed by with a specific mask.

26. (Currently Amended) ~~The Fabrication~~ method of ~~any of claims claim~~ 18 to 24, characterised in that wherein the grating is obtained by localised local heating.

27. (Currently Amended) ~~The Fabrication~~ method of ~~any of claims claim~~ 18 to 24, ~~characterised in that~~ wherein the grating is obtained by etching of the substrate next to the zones of interaction.

28. (Currently Amended) ~~The Fabrication~~ method of ~~any of claims claim~~ 20 to 27, ~~characterised in that~~ further comprising partially burying the first ionic species ~~is buried at least partially before step b)~~ exposing the substrate to the second ionic species and burying that the first and second ionic species ~~are buried after step b)~~ exposing the substrate to the second ionic species.

29. (Currently Amended) ~~The Fabrication~~ method of ~~any of claims claim~~ 20 to 28, ~~characterised in that~~ further comprising burying the first ionic species and the second ionic species ~~are buried after step b)~~ exposing the substrate to the second ionic species.

30. (Currently Amended) ~~The Fabrication~~ method of ~~any of claims claim~~ 20 to 29, ~~characterised in that~~ wherein at least part of the burying ~~is carried out with the application of~~ comprises applying an electrical field to the substrate.

31. (Currently Amended) ~~The Fabrication~~ method of ~~any of claims claim~~ 20 to 30, ~~characterised in that~~ wherein at least part of the burying ~~is carried out by~~ comprises re-diffusion re-diffusing the first and second ionic species in an ionic bath.

32. (Currently Amended) ~~The Fabrication~~ method of ~~any of claims claim~~ 20 to 31, ~~characterised in that all or part of~~ wherein the burying ~~is carried out by~~ includes depositing at least one a layer on the surface of the substrate.

33. (Currently Amended) ~~The Fabrication~~ method of ~~any of claims claim~~ 20 to 32, ~~characterised in that~~ wherein the first ionic species and/or the second ionic species are introduced with the application of an electrical field.